REMARKS

Claims 1, 3-6, 8-11, 13-15 and 17 are pending in this application. By this Amendment, claims 3, 5, 8 and 10 are amended and new claim 17 is added. New claim 17 is supported by the disclosure of the specification from page 15, line 9 to page 16, line 6. No new matter is added.

Applicants thank the Examiner for the courtesies extended during an October 29, 2003, personal interview with Applicants' undersigned representative during which the outstanding rejections were discussed. The remainder of Applicants' separate record of the interview is contained in the remarks below.

Applicants thank the Examiner for the indication that claims 5, 6, 10, 11, 13 and 14 would be allowable if rewritten in independent form. However, as agreed during the personal interview, claims 5 and 10 are already written in independent form with claim 6 depending from claim 5 and claims 11, 13 and 14 depending from claim 10.

The Office Action asserts that in claim 5 the term "circulation" in claim 5 should be circulating." Applicants have made this change in the above- amended claim 5, as well as similar instances in claims 3, 8 and 10.

The Office Action also rejects claims 1, 3, 4, 8, 9 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Ap (U.S. Patent No. 6,448,535) in view of Hamano et al. (U.S. Patent No. 4,558,992). This rejection is traversed for the reasons discussed in the October 29 personal interview.

In particular, present claims 1, 3, 4, 8, 9 and 15 require, *inter alia*, a "cooling system for a fuel cell powered vehicle ... comprising [a] primary circulation pump and [a] secondary

circulation pump... constructed such that flows rates of the primary and secondary circulation pump are differentiated."

As the Office Action correctly notes, Ap "does not show the pumps driven by a single drive motor." However the Office Action asserts that Hamano shows this feature...[and it] would have been obvious to include a single drive motor for the pumps (and that) Hamano further teaches differential flow rates for special applications." (see the first paragraph on page 3 of the Office Action).

However, Hamano et al. contains no teaching or suggestion of differentiated flow rates. Applicants do note that Hamano et al. specifically teach that the pumps are "connected in series to each other thereby to form a two stage compression structure" (see Hamano et al. column 1, lines 38-40). Thus, by definition the air flows through the first pump in the series at the same rate the air flows through the second pump in the series.

For air under a low pressure, air is compressed under a low pressure in both pumps 16 and 18 and exits at discharge tubes 16d and 18a, respectively. Nowhere does Hamano et al. teach or suggest that air compressed under a low pressure in both the low pressure pump and high pressure pumps flows at different flow rates.

As shown in the attached drawings, and particularly to the drawings entitled "High pressure mode/Series mode", a single fluid flows in series in the order of the low pressure pump and the high pressure pump. If the Hamano pump device in the high pressure mode is adapted to the AP's cooling device, two arrangements can be considered as illustrated in the drawings. In order to circulate two fluids such as in the case of the present invention, a plurality of motors, for example, with different pump capacity are required. If only one

motor is employed, two fluids can not be circulated and thus the heat exchanger does not work.

As shown in the drawings entitled "Low pressure mode/Parallel mode", two fluids flow in parallel respectively to the low pressure pump and the high pressure pump. If the Hamano pump device in the low pressure mode is adapted to the AP's cooling device, two arrangements can be considered as illustrated in the drawings. In order to differentiate the flow rates of two fluids such as in the case of the present invention, a plurality of motors, for example, with different pump capacity are required. Hamano discloses that "air is compressed under a low pressure in the high pressure pump 18" (see column 2, line 41-45). Nowhere does Hamano et al. teach or suggest that two fluids can be compressed under different pressures. Hamano et al. is silent to vary the flow rate of the fluid. Applicants cannot find any disclosure concerning "flow rate".

It seems there may be a misunderstanding regarding "pressure" and "flow rate". The "flow rate" can be expressed by the following equation.

Q (flow rate) = V (flow velocity) x S (sectional area)

In other words, Q (flow rate) represents a volume per unit of time.

"Pressure" and "flow rate" are different and they are not in the relation 1:1. The Office Action does not raise any basis supporting that two fluids are differentiated in flow rate.

In any case, Ap includes an electric pump 38 for a first cooling fluid and an electric pump 66 for a second cooling fluid. Applicants note that the first pump 38 is contained in the thermal insulation means 44 ... [in] the form of an insulating enclosure or of another

thermal insulation means, which encompasses the whole of the loop 30, including the fuel cell 12 and the heat exchanger 34.

The second loop 32 [with the second pump 66] is traversed by the mixture of water and of antifreeze, and is therefore not subject to freezing, under these conditions, it is not necessary to surround it with thermal insulation (see Ap column 4, lines 1-10). Thus Applicants respectfully submit that one of ordinary skill in the art would have been expected to use a first rotatable shaft of a single pump motor to drive a pump located inside of the thermal insulation means and also simultaneously a second rotatable shaft of the single pump motor to drive a second pump located outside of a thermal insulation means. In any case, Applicants respectfully submit that it would have required a non-obvious level of invention to create such a unique cooling system.

Neither Ap nor Hamano et al. each or suggest how it would be possible for first and second rotatable shafts of a single motor to simultaneously drive a pump inside a thermal insulation means and a pump located outside of a thermal insulation means, respectively.

Thus, Applicants respectfully submit that the invention of the present claim 1, 3, 4, 8, 9 and 15 would not have been obvious over Ap in view of Hamano et al. Reconsideration and withdrawal of the rejection of claims 1, 3, 4, 8, 9 and 15 under 35 U.S.C. § 103(a) are respectfully requested.

In view of the amendments and remarks above, Applicants submit that this application is in condition for allowance and request favorable action thereon.

In the event this paper is not considered to be timely filed, Applicants hereby petition for an appropriate extension of time. The fee for this extension may be charged to our

Deposit Account No. 01-2300. The Commissioner is hereby authorized to charge any fee deficiency or credit any overpayment associated with this communication to Deposit Account No. 01-2300, referencing Attorney Docket No. 106145-00018.

Respectfully submitted,
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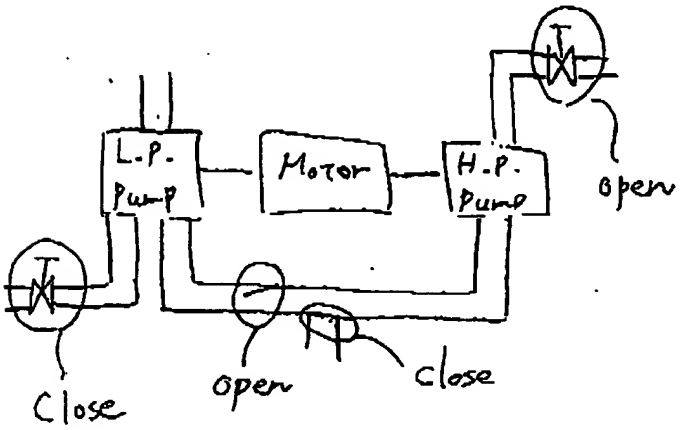
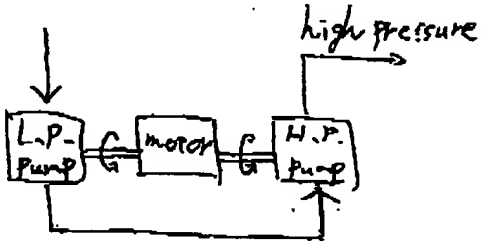
HAMANO PUMP DEVICE

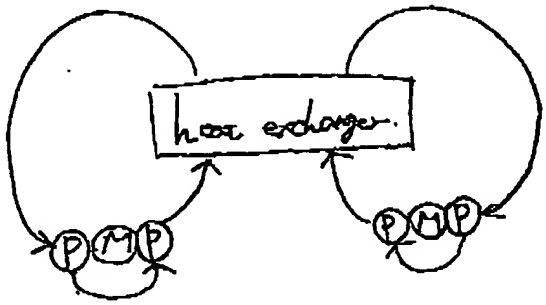
1. High pressure mode/Series mode



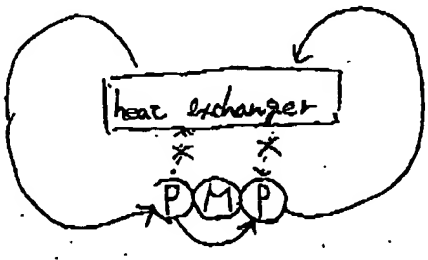
In the high pressure mode, two pumps are connected in series.



If this is adapted to the AP's cooling device, the following arrangements are considered.



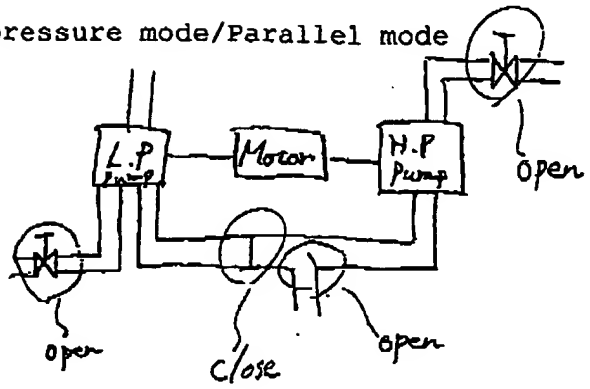
This arrangement requires a plurality of motors.



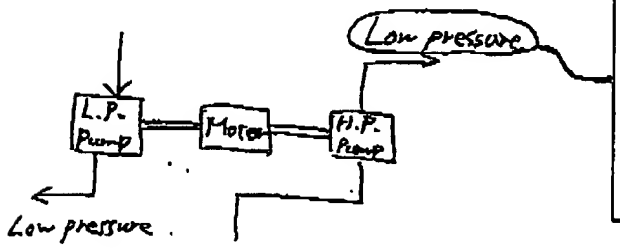
In this arrangement, if only one motor is employed, the heat exchanger does not work.

HAMANO PUMP DEVICE

2. Low pressure mode/Parallel mode

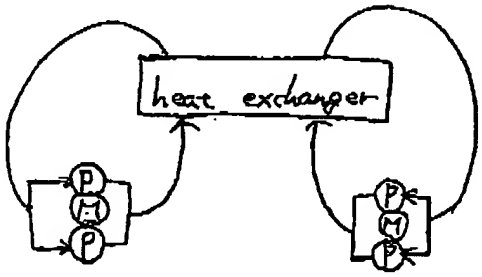


In the low pressure mode, two pumps are connected in parallel.

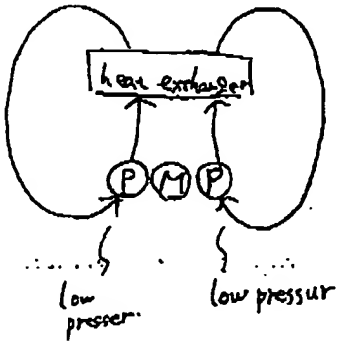


"air is compressed under a low pressure in the high pressure pump 18" (col 2, line41)

If this is adapted to the AP's cooling device, the following arrangements are considered.



This arrangement requires a plurality of motors.



Hamano does not disclose to vary the flow rate. Hamano is silent as to flow rate. "Pressure" and "Flow rate" are different and they are not functionally related to each other.